WHAT IS CLAIMED IS:

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1. A plastic optical fiber with a lens comprising:

a plastic optical fiber including a core and a cladding; and

a lens having a function of controlling light rays, said lens being formed of a material with a thermally-softening temperature higher than a thermally-softening temperature of said core, and said lens being integrated with said plastic optical fiber by heating and pressing said lens against an end face of said plastic optical fiber.

2. The plastic optical fiber with a lens according to claim 1, wherein said lens comprises a light-condensing lens having a spherical surface.

3. The plastic optical fiber with a lens according to claim 2, wherein said lens comprises a ball lens.

4. The plastic optical fiber with a lens according to claim 1, wherein said lens comprises a light-condensing lens having a semispherical surface.

5. The plastic optical fiber with a lens according to claim 1, wherein said lens is formed of glass.

6. The plastic optical fiber with a lens according to claim

1, wherein said lens is formed of polymer.

7. The plastic optical fiber with a lens according to claim 1, wherein said plastic optical fiber comprises a totally-fluorine-contained plastic optical fiber.

8. The plastic optical fiber with a lens according to claim 1, wherein said lens has a diameter smaller than a diameter of said plastic optical fiber.

9. The plastic optical fiber with a lens according to claim 8, wherein said lens is bonded to said plastic optical fiber at a peripheral portion of said lens with an adhesive.

10. A method of fabricating a plastic optical fiber with a lens, said method comprising the steps of:

preparing a thermally-conductive substrate for holding a lens in a predetermined position;

holding the lens in the predetermined position on the substrate;

heating the substrate and the lens held thereby to a temperature below a thermally-softening temperature of the lens and above a thermally-softening temperature of a core of a plastic optical fiber; and

pressing an end face of the plastic optical fiber against the heated lens to mold the end face of the plastic optical fiber to integrate the lens with the plastic optical fiber and cause an end of the plastic optical fiber to have a function of controlling

light rays.

11. The method of fabricating a plastic optical fiber with a lens according to claim 10, wherein in said preparing step the thermally-conductive substrate is prepared such that a portion with a contour for holding the lens in the predetermined position is formed directly or indirectly on the thermally-conductive substrate.

12. The method of fabricating a plastic optical fiber with a lens according to claim 11, wherein in said preparing step the thermally-conductive substrate is prepared such that an adjusting surface for adjusting a positional relationship in an optical-axial direction between the lens and the plastic optical fiber is also formed near the portion with a contour for holding the lens, and in said pressing step a periphery of the end face of the plastic optical fiber is caused to abut the adjusting surface when the end face of the plastic optical fiber is pressed against the heated lens.

13. The method of fabricating a plastic optical fiber with a lens according to claim 10 further comprising the step of providing an alignment member for holding an end portion of the plastic optical fiber and aligning optical axes of the lens and the plastic optical fiber with each other on the substrate, wherein the optical axes of the lens and the plastic optical fiber are caused to align with each other when the end face of the plastic optical fiber is pressed against the heated lens in said pressing

step.

14. The method of fabricating a plastic optical fiber with a lens according to claim 10, wherein in said holding step the lens held in the predetermined position has a diameter smaller than a diameter of the plastic optical fiber.

15. The method of fabricating a plastic optical fiber with a lens according to claim 10 further comprising the step of bonding the lens to the plastic optical fiber at a peripheral portion of the lens with an adhesive.

16. A light-emitting/receiving apparatus comprising:

a light-emitting/receiving device arranged on a substrate;

a plastic optical fiber including a core and a cladding; and

a lens having a function of controlling light rays, said lens being arranged above said light-emitting/receiving device and formed of a material with a thermally-softening temperature higher than a thermally-softening temperature of said core, and said lens being integrated with said plastic optical fiber by having been heated and pressed against an end face of said plastic optical fiber.

17. The light-emitting/receiving apparatus according to claim 16, wherein said substrate has a portion for holding said lens in a predetermined position, said portion being formed directly or indirectly on said substrate.

18. The light-emitting/receiving apparatus according to claim 17, wherein an adjusting surface for adjusting a positional relationship in an optical-axial direction between said lens and said plastic optical fiber is also formed near said portion for holding said lens, and a periphery of the end face of said plastic optical fiber abuts said adjusting surface.

19. The light-emitting/receiving apparatus according to claim 18, wherein said lens has a diameter smaller than a diameter of said plastic optical fiber, said portion for holding said lens comprises a recess whose size is larger than the diameter of said lens and smaller than the diameter of said plastic optical fiber, and said adjusting surface comprises a surface around said recess.

20. The light-emitting/receiving apparatus according to claim 17, wherein said portion for holding said lens is formed integrally with said lens and of a material common to said lens and integrally with said lens.

21. The light-emitting/receiving apparatus according to claim 16, wherein said substrate is provided with an alignment member for holding an end portion of said plastic optical fiber and aligning optical axes of said lens and said plastic optical fiber with each other.

22. The light-emitting/receiving apparatus according to

claim 16, wherein said lens is a light-condensing lens having a spherical surface.

23. The light-emitting/receiving apparatus according to claim 22, wherein said lens is a ball lens.

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24. The light-emitting/receiving apparatus according to claim 16, wherein said lens is a light-condensing lens having a semispherical surface.

25. The light-emitting/receiving apparatus according to claim 16, wherein said lens is formed of glass.

26. The light-emitting/receiving apparatus according to claim 16, wherein said lens is formed of polymer.

27. The light-emitting/receiving apparatus according to claim 16, wherein said plastic optical fiber is a totally-fluorine-contained plastic optical fiber.

28. The light-emitting/receiving apparatus according to claim 16, wherein said lens is bonded to said plastic optical fiber at a peripheral portion of said lens with an adhesive.

29. A method of fabricating a light-emitting/receiving apparatus, said method comprising the steps of:

preparing a thermally-conductive substrate for arranging

a light-emitting/receiving device and holding a lens in predetermined positions, respectively;

arranging the light-emitting/receiving device in the predetermined position on the substrate;

holding the lens in the predetermined position on the substrate;

heating the substrate and the lens held thereby to a temperature below a thermally-softening temperature of the lens and above a thermally-softening temperature of a core of a plastic optical fiber; and

pressing an end face of the plastic optical fiber against the heated lens to mold the end face of the plastic optical fiber to integrate the lens with the plastic optical fiber and cause an end of the plastic optical fiber to have a function of controlling light rays.

30. The method of fabricating a light-emitting/receiving apparatus according to claim 29, wherein in said preparing step the thermally-conductive substrate is prepared such that a portion for holding the lens in the predetermined position is formed directly or indirectly on the thermally-conductive substrate.

31. The method of fabricating a light-emitting/receiving apparatus according to claim 30, wherein in said preparing step the thermally-conductive substrate is prepared such that an adjusting surface for adjusting a positional relationship in an optical-axial direction between the lens and the plastic optical

fiber is also formed near the portion for holding the lens, and in said pressing step a periphery of the end face of the plastic optical fiber is caused to abut the adjusting surface when the end face of the plastic optical fiber is pressed against the heated lens.

32. The method of fabricating a light-emitting/receiving apparatus according to claim 29 further comprising the step of providing an alignment member for holding an end portion of the plastic optical fiber and aligning optical axes of the lens and the plastic optical fiber with each other on the substrate, wherein the optical axes of the lens and the plastic optical fiber are caused to align with each other when the end face of the plastic optical fiber is pressed against the heated lens in said pressing step.

33. The method of fabricating a light-emitting/receiving apparatus according to claim 29, wherein the lens held in said holding step has a diameter smaller than a diameter of the plastic optical fiber.

34. The method of fabricating a light-emitting/receiving apparatus according to claim 29 further comprising the step of bonding the lens to the plastic optical fiber at a peripheral portion of said lens with an adhesive.